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Ingredient Impact on Texture of Commercial Milk Beverages

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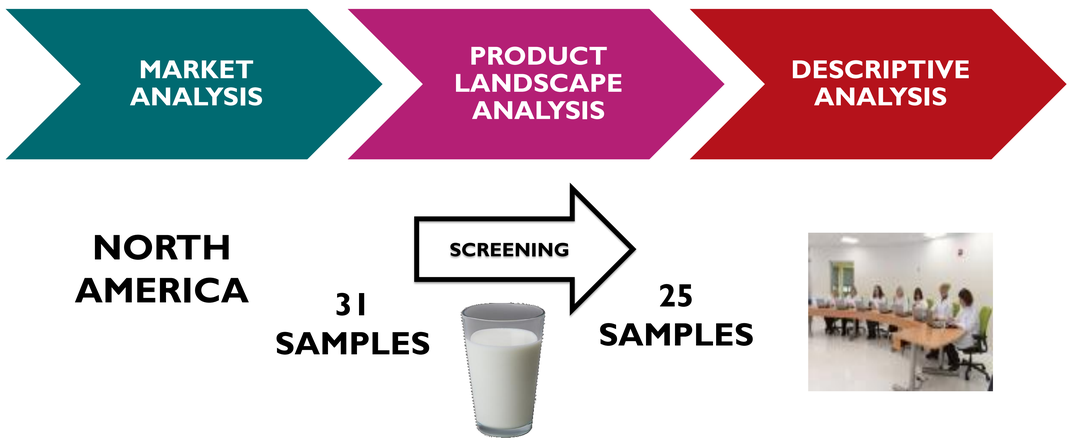
INTRODUCTION

- There has been an increase in dairy alternative milk beverages that compete with traditional dairy-based milks due to factors such as environmental concerns and changes in consumer preference.
- Manufacturers of plant-based dairy alternatives formulate their products to mimic the gold standard texture of 2% fat dairy milk.
- A variety of ingredients, such as starches and hydrocolloids, can be utilized to transform the texture profile of dairy alternative milk beverages.

OBJECTIVE

- Create sensory map of North American (NA) dairy and dairy alternative milk beverages
- To understand the textural characteristics of milk beverages in the NA market place
- Identify sensory textural gaps of dairy alternative milk beverages versus 2% fat dairy milk to drive innovation opportunities in this space
- Understand the impact of texturizing ingredients on the texture of milk beverages

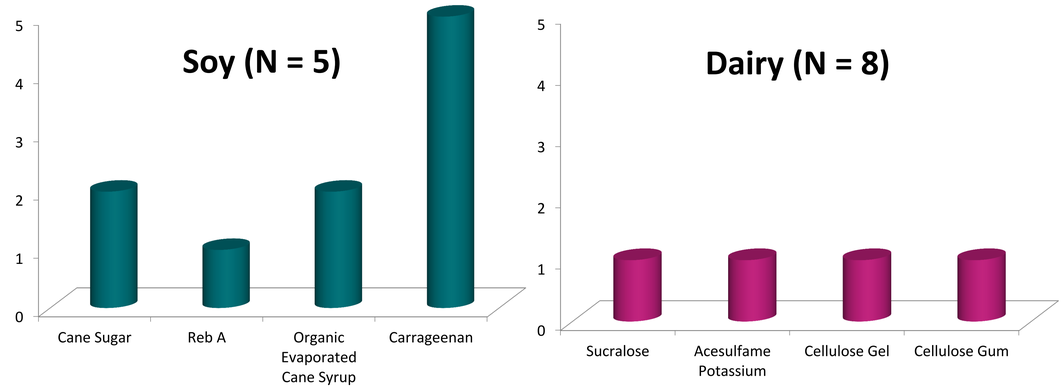
APPROACH

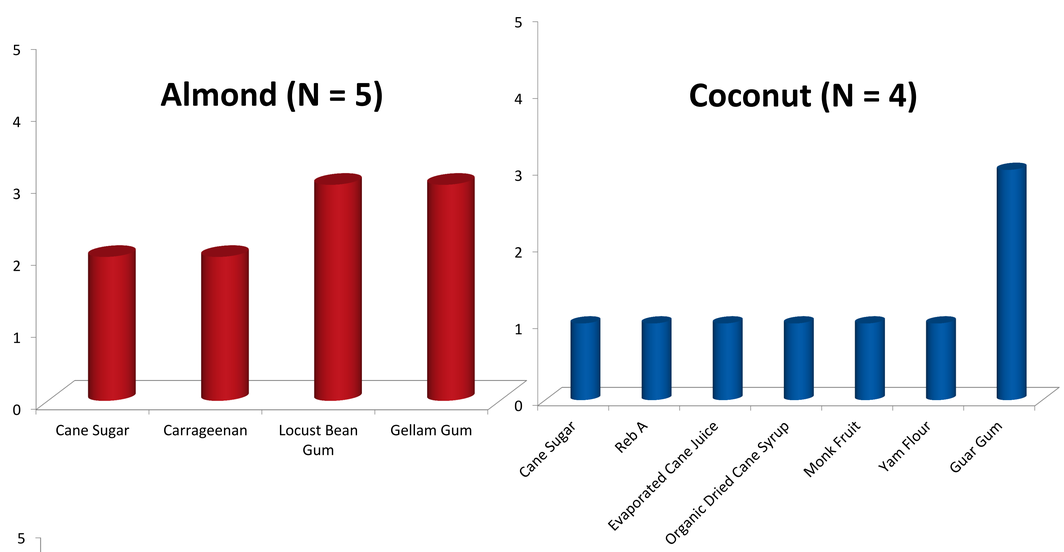


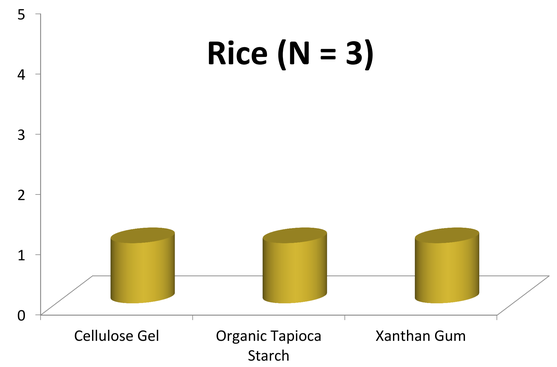
Milk Beverage Samples Evaluated

Soy Milk	Dairy Milk	Almond Milk	Coconut Milk	Rice Milk
• 2 – Original • 1 – Light • 1 – Unsweetened • 1 – Reduced Fat	• 2 – 3.25% Fat • 2 – 2% Fat • 3 – 0% Fat • 1 – Reduced Calorie	• 2 – Original • 1 – Light • 2 - Unsweetened	• 2 – Original • 1 – Unsweetened • 1 – Sugar Free	• 2 – Original • 1 - Unsweetened

Sweeteners & Texturizers Present in Commercial Milk Beverages







- Carrageenan is a common texturizer for Soy milks
- Reduced calorie dairy drinks is made with high intensity sweeteners and hydrocolloids
- Almond milk is produced with a number of hydrocolloids
- Coconut milk is produced with a variety of sweeteners
- Rice milk contains a combination of starch & hydrocolloids

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RESULTS

DESCRIPTIVE ANALYSIS - SENSORY MAP

- 25 milk beverage
  - 5 Pulse (Soy)
  - 8 Dairy
  - 9 Tree Nut
    - 5 Almond
    - 4 Coconut
  - 3 Cereal (Rice)
- 25 attributes (appearance, texture & residual)



FINDINGS

- The product broke down into 2 regions, mainly based on the origin of the principal ingredient (Plant versus Animal based)
- Within these 2 regions, 4 clusters were statistically identified
- Texture profile was affected by nutritional content
  - Protein content negatively correlated with residual chalkiness and mouthdrying
  - Fat content positively correlated to opacity and 1st sip viscosity
  - Sugar content negatively correlated to in-mouth and residual chalkiness and residual mouthdrying
- Milk beverages made with carrageenan tended to be residually chalky and mouthdrying
  - Protein denaturation due to thermal processing of the beverages

RECOMMENDATIONS

- Development efforts should focus on appearance, in-mouth texture, and residual texture

CONCLUSIONS

- There are 4 distinguishable textural spaces largely based on the principal raw material in the beverage.
- Protein, Fat, and Sugar content has an affect on the texture profile of the milk beverages, particularly chalky mouthfeel and residual mouth drying
- Striving to model the texture of alternative dairy beverages on dairy milk is a present challenge. However, creating "new" textures with innovative clean label ingredients that are acceptable to consumers will lead the path to creative development.

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